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ecom, usa ltr, 29 nov 1971

D800.618

Ionospheric Data Report – March 1964

IONOSPHERIC DATA: BANGKOK, THAILAND

Compiled by: VICHAI T. NIMIT

Prepared for:

U.S. ARMY ELECTRONICS LABORATORIES
FORT MONMOUTH, NEW JERSEY

CONTRACT DA-36-039-AMC-00040(E)
ORDER NO. 5384-PM-63-91

SPONSORED BY THE ADVANCED RESEARCH PROJECTS AGENCY
FOR THE
THAI-U.S. MILITARY RESEARCH AND DEVELOPMENT CENTER
SUPREME COMMAND HEADQUARTERS
BANGKOK, THAILAND

STANFORD RESEARCH INSTITUTE

MENLO PARK, CALIFORNIA

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(11) Dec[redacted]64
(12) 21 p.

(9) [redacted] Data Report – Mar[redacted]64,

(6) IONOSPHERIC DATA: BANGKOK, THAILAND

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U.S. ARMY ELECTRONICS LABORATORIES
FORT MONMOUTH, NEW JERSEY

(15) [redacted] DA-36-039-AMC-00040(E); ARPA Order-371

[redacted]
(10) VICHAI T. NIMIT

(16) SRI-[redacted]4240

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CONTENTS

ILLUSTRATIONS

I INTRODUCTION

Ionospheric observations are being carried out at the Laboratory of the Military Research and Development Center at Bangkok, Thailand, a joint United States-Thailand organization. A Model C-2 vertical-incidence sounder supplied and operated by the United States Army Radio Propagation Agency has been installed there. Table I gives pertinent information about the site.

Table I

VERTICAL-INCIDENCE SOUNDER SITE
AT BANGKOK, THAILAND

Geographic		Geomagnetic	
Latitude	Longitude	Latitude	Longitude
13.73°N	100.57°E	2.5°N	169.83°E

Dip angle: 10°N

Distance from dip equator: 450 km

Equipment:

Instrument: Type C2 (automatic)

PRF: 60 pps

Frequency sweep time: 30 sec

Frequency sweep range: 1 to 25 Mc

Pulse duration: 50 μsec

Peak pulse power: approximately 10 kw.

The cooperation and participation of staff members of the Thailand Ministry of Defense and the support of the United States Advanced Research

Projects Agency, the United States Army Electronics Laboratories, and the United States Army Radio Propagation Agency made it possible for the data presented in this report to be accumulated.

II TERMINOLOGY AND SYMBOLS

The terminology and symbols used in this data report are in accordance with the conventions established by the World Wide Soundings Committee.[1]

A. TERMINOLOGY

f_oF_2 f_oF_1 f_oE	The ordinary wave critical frequency for the F_2 and F_1 layers and the E region, respectively.
f_oE_s	The ordinary wave top frequency corresponding to the highest frequency at which a mainly continuous E_s trace is observed.
f_bE_s	The blanketing frequency of an E_s layer, i.e., the lowest ordinary wave frequency at which the E_s layer begins to become transparent. (This is usually determined from the minimum frequency at which reflections from layers at greater heights are observed.)
f_{min}	The frequency below which no echoes are observed.
M(3000)F_2	The maximum usable frequency factor for a path of 3000 km for transmission by the F_2 layer.
h'F_2	The minimum virtual height of the ordinary wave trace for the highest stable stratification in the F region.
h'F	The most significant F-region virtual height parameter, that for the lowest F-region stratification. (Thus h'F is identical with the current h'F_2 when F-region stratification is absent, i.e., at night, and with current h'F_1 when F_1 stratification is present.)

[1]W. R. Piggott and K. Rawer, URSI Handbook of Ionogram Interpretation and Reduction of the World Wide Sounding Committee (Elsevier Publishing Company, Amsterdam, London, New York, 1961).

B. DESCRIPTIVE LETTERS

Certain effects observed on ionograms may make it difficult or impossible to obtain accurate numerical values. The descriptive letters listed below, when used alone indicate, in general, the presence of a phenomenon that may have influenced the measurement. Qualifying letters (Sec. C) indicate the nature of the uncertainty.

- A A lower thin layer present, e.g., E_s
- B Absorption in the vicinity of f_{min}
- C Any non-ionospheric reason
- D The upper limit of the normal frequency range
- E The lower limit of the normal frequency range
- F Spread echoes present
- G Ionization density of the layer too small for measurement
- H Stratification present
- L No sufficiently definite cusp between layers of the trace
- M Ordinary and extraordinary components indistinguishable
- N Conditions such that the measurement cannot be interpreted
- O Measurement referring to the ordinary component
- R Attenuation in the vicinity of a critical frequency
- S Interference or atmospherics
- T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful
- V Forked trace
- W Echo lying outside the height range recorded
- X Measurement referring to the extraordinary component
- Y Intermittent trace
- Z Third magneto-ionic component present.

C. QUALIFYING LETTERS

- D Greater than. . .
- E Less than. . .

I An interpolated value

J Ordinary component characteristic deduced from the extraordinary component

O Extraordinary component characteristic deduced from the ordinary component

T Value determined by a sequence of observations, the actual observation being inconsistent or doubtful

U Uncertain numerical value

Z Measurement deduced from the third magneto-ionic component.

D. DESCRIPTION OF STANDARD TYPES OF E_s

The eight standard types of E_s are identified by lower-case letters: f, l, c, h, q, r, a, and s. These letters suggest the corresponding names, flat, low, cusp, high, equatorial, retardation, auroral, and slant, respectively, but are not restrictive. The letter n is used to designate an E_s trace that does not correspond to one of the eight types. The classifications are:

f An E_s trace showing no appreciable increase of height with frequency, usually relatively solid at most latitudes. (This classification may be used only at night; it appears that flat E_s traces observed in the daytime are classified according to their virtual height: h or l.)

l A flat E_s trace at or below the normal E-region minimum virtual height in the day or below the E-region minimum virtual height at night.

c An E_s trace showing a relatively symmetrical cusp at or below $f_o E$. (This is usually continuous with the normal E trace, although when the deviative absorption is large, part or all of the cusp may be missing—usually a daytime type.)

h An E_s trace showing a discontinuity in height with the normal E-region trace at or above $f_o E$ and an asymmetrical cusp. (The low-frequency end of the E_s trace lies clearly above the high-frequency end of the normal E trace—usually a daytime type.)

q An E_s trace that is diffuse and nonblanketing over a wide frequency range, the spread being most pronounced at the upper edge of the trace. (This type is common in daytime in the vicinity of the magnetic equator.)

r An E_s trace that is nonblanketing over part or all of its frequency range, showing an increase in virtual height at the high-frequency

end similar to group retardation. (This is distinguished from the usual group retardation—as in the case of an occulting thick E region—by the lack of group retardation in the F traces at corresponding frequencies and the lack of complete blanketing.)

a An E_s pattern having a well-defined flat or gradually rising lower edge with stratified and diffuse (spread) traces present above it. (These sometimes extend over several hundred kilometers of virtual height.)

s A diffuse E_s trace that rises steadily with frequency, usually emerging from another type of E_s trace. (The rising trace alone is classified as s; the horizontal trace is classified separately. At high latitudes, the slant trace usually starts to rise from a horizontal E_s trace, such as l or f, at frequencies that greatly exceed the E-region critical frequency, e.g., about 6 Mc; whereas at low latitudes it usually rises from equatorial-type E_s, q, c, or h, at frequencies near the regular E critical frequency. Type s is never used to determine f_o E unless echoes clearly identifiable as E_s echoes are seen.)

n An E trace that cannot be classified as one of the standard types. (This must not be used for intermediate cases between any two classes. A choice should always be made whenever possible, even if it is doubtful.)

E. MULTIPLE REFLECTIONS FROM E_s

When the ionogram shows the presence of multiple reflections from E_s, the number of traces seen will be recorded with the letter indicating the type.

Characteristic: f_{min}

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	E015S	012*	E	E	015	E015S	E018S	E022S	E027S	E030S	031	035	033	033
2	E017S	E017S	013	020	019	E017S	S	E024S	E027S	E030S	E026S	038	040	038
3	E015S	E015S	012	015	014	018	E017S	E023S	E027S	E027S	034	030	036	036
4	E016S	E015S	E	012	016	E014S	S	E025S	E027S	E032S	038	040	036	035
5	E015S	012	012	E	017	E015S	E016S	E020S	E024S	035	E030S	036	034	034
6	E016S	E015S	012	013	017	E013S	S	E019S	E023S	E028S	E026S	034	033	035
7	E016S	E	012	012	015	018	E017S	E018S	E022S	E023S	029	E029S	040	040
8	E015S	019	013	012	E	E017S	E017S	019	E023S	030	034	037	030	035
9	E017S	E014S	017	012	E017S	E016S	E017S	E027S	E023S	E029S	036	029	037	034
10	020	015	E	020	E017S	E017S	E017S	E024S	E027S	E027S	036	040	040	039
11	017	014	014	014	E017S	E017S	E018S	E025S	E028S	037	E038S	040	040	040
12	018	012	016	012	012	E015S	E017S	E025S	E027S	036	030	037	038	040
13	E017S	011	020	017	014	S	E017S	E024S	E029S	032	E038S	036	037	038
14	E017S	015	014	012	B	S	E017S	E027S	E028S	033	E027S	E025S	E030S	E030S
15	E017S	015	015	012	017	S	E027S	E035S	E033S	035	E045S	E045S	E045S	E049S
16	E017S	012	011	011	E	B	S	E024S	E027S	E027S	036	040	050	040
17	E016S	E	016	011	012	S	E017S	E023S	E027S	E038C	E027S	E028S	035	039
18	E018S	E014S	013	013	E	E014S	E017S	E017S	E027S	E027S	031	E029S	E029S	E026S
19	E015S	012	017	018	E016S	S	E020S	E018S	E029S	E029S	033	C	E029S	E030S
20	023	024	025	023	B	B	023	024	034	029	C	030	E027S	028
21	E017S	E014S	012	017	E016S	E016S	E017S	E020S	E025S	029	E027S	036	E029S	035
22	E017S	E	012	011	B	S	E017S	E018S	029	031	033	E028S	034	035
23	020	017	013	017	S	E025S	E020S	E025S	029	030	035	037	040	035
24	E014S	017	E016S	014	E016S	E017S	019	E025S	032	030	040	040	040	E050S
25	020	020	021	020	020	E017S	E022S	029	032	034	034	038	040	040
26	020	E014S	020	021	020	E019S	023	029	029	033	040	040	050	050
27	024	016	017	015	B	B	S	027	030	030	034	E050S	E052S	050
28	021	020	016	020	017	020	018	020	027	027	031	030	031	034
29	E017S	020	017	023	017	B	E017S	022	023	030	035	040	031	029
30	020	020	023	020	B	B	S	E024S	031	029	028	042	030	030
31	E017S	020	E014S	012	019	E014S	E017S	E027S	029	034	038	030	030	028
Median	017	015	015	014	017	017	017	024	027	030	034	037	036	035
Count	31	28	28	29	22	20	25	31	31	31	30	30	31	31
UQ	020	018	017	020	017	017	019	025	029	033	036	040	040	040
LQ	016	014	013	012	015	015	017	020	027	029	030	030	030	033
QR	4	4	4	8	2	2	2	5	2	4	6	10	10	7

* Tabulation of 012 = 1.2 Mc.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
E027S	E030S	031	035	033	033	032	E033S	E030S	E027S	E027S	EC32S	E035S	E035S	E035S	E018S
E027S	E030S	E026S	038	040	038	040	E033S	030	E029S	E026S	E032S	E025S	E023S	E023S	E017S
E027S	E027S	034	030	036	036	036	033	E030S	E030S	E020S	E020S	E017S	E017S	E019S	E017S
E024S	035	E03CS	036	034	034	E045S	E035S	E035S	E035S	E031S	E030S	E026S	E025S	E025S	E017S
E023S	E028S	E026S	034	033	035	034	027	E039S	F040S	E025S	E025S	E035S	E030S	E024S	E017S
E022S	E023S	029	E029S	040	040	035	036	E034S	E035S	E033S	E033S	E026S	E027S	E028S	E017S
E023S	030	034	037	030	035	034	027	E024S	E023S	E017S	E024S	E019S	E019S	E017S	E017S
E023S	E029S	036	029	037	034	034	030	026	022	E017S	E020S	E018S	E017S	E017S	E017S
E027S	E027S	036	040	040	039	040	035	032	E025S	E018S	023	E018S	E018S	E021S	E017S
E028S	037	E038S	040	040	040	040	031	033	E028S	E023S	E020S	E019S	E017S	E018S	014
E027S	036	030	037	038	040	040	034	035	E027S	E027S	E035S	E029S	E029S	E027S	E020S
E029S	032	E038S	036	037	038	040	033	031	E032S	E034S	E025S	E030S	E035S	E029S	E017S
E028S	033	E027S	E025S	E030S	E030S	033	033	033	E035S	E032S	E033S	E030S	E028S	E025S	E017S
E033S	035	E045S	E045S	E045S	E049S	E044S	E044S	E041S	E040S	E025S	E028S	E035S	E028S	E030S	E018S
E027S	E027S	036	040	050	040	E040S	037	E035S	E035S	E024S	E035S	E018S	E022S	E017S	E017S
E027S	E038C	E027S	E028S	035	039	040	040	030	E028S	E023S	E022S	020	E017S	022	019
E027S	E027S	031	E029S	E029S	E026S	035	025	034	E027S	E020S	E017S	E024S	E022S	E019S	E017S
E029S	E029S	033	C	E029S	E030S	E025S	034	E025S	E026S	E020S	C	030	E025S	023	025
034	029	C	030	E027S	028	030	E021S	E022S	E025S	E019S	E017S	E017S	E018S	E024S	E017S
025S	029	E027S	036	E029S	035	035	033	E025S	E025S	E018S	E017S	E018S	E017S	E017S	E017S
029	031	033	E028S	034	035	033	E031S	E025S	E017S	E018S	E019S	E018S	E017S	E017S	019
029	030	035	037	040	035	035	026	E026S	E019S	E017S	E017S	E017S	E024S	E017S	E017S
032	030	040	040	040	E050S	039	E031S	E027S	E023S	E025S	020	E022S	026	022	025
032	034	034	038	040	040	028	032	029	E027S	020	020	E023S	E019S	E022S	024
029	033	040	040	050	050	E046C	035	031	E032S	E025S	E020S	022	E022S	E017S	E022S
030	030	034	E050S	E052S	050	042	E034S	E032S	E029S	E025S	E020S	E026S	E022S	E017S	020
027	027	031	030	031	034	030	E036S	E033S	E034S	E025S	E023S	E025S	E027S	025	020
023	030	035	040	031	029	E028S	051	060	E031S	E052S	E028S	E052S	S	E030S	E018S
031	029	028	042	030	030	028	E021S	030	E027S	E024S	E017S	E025S	E022S	E020S	021
029	034	038	030	030	028	029	E039S	030	E028S	E023S	E025S	E018S	E018S	E019S	E017S
027	030	034	037	036	035	035	033	031	036	024	023	024	022	022	017
31	31	30	30	31	31	31	31	31	31	31	30	31	30	31	31
029	033	036	040	040	040	040	035	034	040	027	030	030	027	025	020
027	029	030	030	030	033	032	031	027	030	020	020	018	018	017	017
2	4	6	10	10	7	8	4	7	10	7	10	12	9	8	3

B

Characteristic: f_0F2

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
1	070*	067	050	023	021	A	022	055	067	075	072	068	066	066	070
2	F	F	F	F	028	019	S	046	063	071	068	062	063	064	068
3	F	F	F	F	F	023	A	046	061	066	065	063	066	062	067
4	054	050	052	053	026	D015S	S	I047S	061	075M	062	067	066	077	085
5	035	028	027	023	020	A	024	059	071	D088S	087	082	077	077	078
6	066	063	055	F	A	A	S	054	072	085	088	075	075	077	082
7	F	063	070	044	029	024	J023S	059	077	085	078	075	075	073	078
8	058	J059S	051	033	026	024	032	062	077	085	085	071	075	076	080
9	U060S	050	049	048	047	038	021	055	071	078	085	077	078	083	D075S
10	068	053	048	034	025	A	A	055	070	080	080	077	075	070	072
11	058	062	060	049	036	028	025	053	067	075	080	075	075	075	083
12	060	062	D057S	039	029	019	028	057	U065C	067	063	062	070	083	098
13	070	063	J060S	026	J017R	S	D021S	055	067	068	064	065	065	071	082
14	F	060	F	014	B	S	U022S	058	082	085	070	066	065	071	080
15	U046S	044	037	018	A	S	034	063	070	069	063	061	068	070	077
16	056	055	055	029	J016S	B	S	053	065	067	063	058	065	068	075
17	045	045	050	027	015	S	032	U060S	070	068	071	065	067	070	075
18	F	049	054	042	025	021	025	053	065	075	075	086	067	J068S	075
19	F	F	F	033	018	S	031	J038S	067	062	059	C	062	065	073
20	044	F	F	D025R	B	B	035	057	D064R	061	C	D055S	055	061	069
21	F	F	F	F	F	F	F	055	070	075	073	068	068	075	080
22	037	042	D035S	019	B	S	030	056	078	078	D075S	070	068	074	082
23	J059S	045	J020R	A	S	D043S	065	078	082	D088S	080	077	082	096	U100S
24	043	032	023	021	017	028	J058S	068	063	068	067	063	075	D087S	D093R
25	066	068	048	042	029	029	059	072	061	060	A	067	074	088	U093S
26	075	081	066	042	D023R	A	A	052	065	067	072	080	082	087	085
27	U046S	045	D035S	021	B	B	S	046	065	068	066	U070S	D067S	080	088
28	F	081	054	A	A	A	S	055	070	070	062	061	062	079	075
29	070	F	074	043	025	B	A	U050S	068	077	065	061	056	069	075
30	F	F	F	032	B	B	S	U050S	065	070	057	055	056M	065	075
31	J052S	053	J050S	D037S	033	D018R	028	056	067	065	065	070	075	085	U090S
Median	058	054	050	033	025	024	028	055	067	071	070	068	068	074	078
Count	22	24	24	26	20	13	19	31	31	31	29	30	31	31	31
UQ	066	063	056	042	029	028	034	059	071	078	079	075	075	080	085
LQ	046	045	043	023	019	019	023	052	065	067	064	062	065	068	075
QR	20	18	13	19	10	9	11	7	6	11	15	13	20	12	10

* Tabulation 070 = 7.0 Mc.

A

IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
075	072	068	066	066	070	076	078	087	D090S	D087S	F	F	F	F
071	068	062	063	064	068	069	082	088	D090S	D087S	D075S	F	F	F
066	065	063	066	062	067	070	077	087	D090S	D088S	077	066	061	F
075M	062	067	066	077	085	090	099	D090S	D088S	D090S	D077R	090	070	046
D088S	087	082	077	077	078	080	085	085	D090S	D094S	087	074	070	070
085	088	075	075	077	082	090	093	D090S	D090S	D090S	D090S	D090S	085	F
085	078	075	075	073	078	087	090	D090S	D095S	D095S	087	080	074	070
085	085	071	075	076	080	081	081	078	079	F	F	077	F	072
078	085	077	078	083	D075S	092	090	088	078	082	077	075	073	070
080	080	077	075	070	072	083	081	080	077	078	076	067	057	056
075	080	075	075	075	083	093	100	095	D090S	D090S	D097S	078	073	J040S
067	063	062	070	083	098	100	095	D088S	D090S	D093S	D090S	U090S	083	077
068	064	065	065	071	082	100	097	084	083	085	082	081	078	068
085	070	066	065	071	080	087	095	090	086	090	090	084	067	U053S
069	063	061	068	070	077	093	095	D095S	U093S	093	090	078	067	060
067	063	058	065	068	075	085	100	D090S	D087S	D090S	078	067	D055S	J050S
068	071	065	067	070	075	085	086	090	097	D090S	F	F	F	F
075	075	086	067	J068S	075	088	085	085	D090S	87	F	F	F	F
062	059	C	062	065	073	085	U095$	D090S	D087S	C	D070S	F	F	F
061	C	D055S	055	061	069	076	077	080	082	077	D075S	F	F	F
075	073	068	068	075	080	088	D090$	D087S	D085S	D088S	085	075	056	U045C
078	D075S	070	068	074	082	U090S	D086$	D087S	D087S	D090S	075	U066S	055	D050S
D088S	080	077	082	096	U100S	D090S	D095$	D085S	D087S	085	075	065	053	046
068	067	063	075	D087S	D093R	D097S	U087$	D085S	D086S	D085S	D086S	087	070	067
060	A	067	074	088	U093S	D093S	D093$	D087S	D087S	D089S	D088S	D088S	D088S	080
067	072	080	082	087	085	101	D100$	D090S	D086S	D090S	D085S	082	065	J050S
068	066	U070S	D067S	080	088	090	D090$	D087S	D090S	D095S	D088S	088	083	075
070	062	061	062	079	075	090	D095$	D090S	D090S	D091S	080	F	F	073
077	065	061	056	069	075	D076S	D085$	D077S	D078S	D075S	075	S	D035S	F
070	057	055	056M	065	075	086	D095$	D090S	D088S	D090S	D090S	077	066	056
065	065	070	075	085	U090S	D095S	D089$	D090S	D088S	D087S	D087S	083	U078S	075
071	070	068	068	074	078	088	090	088	088	090	085	078	070	064
31	29	30	31	31	31	31	31	31	31	28	27	23	23	22
078	079	075	075	080	085	093	095	090	090	090	088	084	078	072
067	064	062	065	068	075	083	085	085	086	086	076	074	057	050
11	15	13	20	12	10	10	10	5	4	4	12	10	21	22

B

Characteristic: M(3000)F2

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	
1	350*	370	370	360	370	A	330	360	330	290	260	275	260	260	
2	F	F	F	F	390	380	S	360	350	300	260	280	260	280	
3	F	F	F	F	F	390	A	350	320	270	260	265	260	270	
4	310	320	340	400	370	S	S	S	360	290M	280	270	260	310	
5	360	360	340	330	310	A	290	340	330	S	250	270	270	260	
6	340	350	390	F	A	A	S	360	330	290	240	270	280	265	
7	F	330	380	370	380	370	S	350	330	290	270	290	270	260	
8	360	S	400	370	310	370	330	350	340	290	260	280	270	230	
9	U340S	340	360	370	380	380	350	360	350	310	260	280	285	280	
10	380	400	370	390	380	A	A	340	310	280	270	300	270	265	
11	340	350	380	380	390	380	340	350	340	300	250	280	260	280	
12	320	340	S	380	380	380	340	350	U290C	260	270	280	290	300	
13	350	350	S	400	J240R	S	S	340	290	265	270	280	280	260	
14	F	370	F	380	B	S	U340S	350	340	290	270	260	270	270	
15	U350S	360	390	380	A	S	330	340	290	270	290	270	270	290	
16	345	380	385	390	S	B	S	350	300	250	270	290	265	280	
17	320	345	390	400	380	S	340	U330S	290	290	260	250	260	280	
18	F	330	360	400	310	360	330	350	320	280	250	280	280	S	
19	F	F	F	400	370	S	340	S	280	250	265	C	275	280	
20	320	F	F	R	B	B	360	350	R	270	C	S	270	260	
21	F	F	F	F	F	F	F	360	320	280	250	260	260	270	
22	330	350	S	400	B	S	320	350	320	280	S	260	260	260	
23	S	400	R	A	S	S	345	310	310	S	250	280	310	310	U3
24	380	370	350	350	360	330	S	270	270	280	260	300	280	S	
25	350	360	350	350	380	340	320	270	280	280	A	280	270	290	U3
26	320	350	375	370	R	A	A	330	280	270	280	295	320	320	
27	U350S	350	S	390	B	B	S	360	300	290	275	U280S	S	295	
28	F	385	380	A	A	A	A	360	320	270	280	270	285	270	
29	320	F	390	390	390	B	A	U360S	350	300	260	275	270	275	
30	F	F	F	320	B	B	S	U360S	320	260	280	280	280	270	
31	S	330	S	S	370	R	350	340	275	270	290	280	280	280	U3
Median	342	350	378	380	375	375	340	350	320	280	265	280	270	275	
Count	20	23	18	23	18	10	16	29	30	29	28	29	30	29	
UQ	350	370	390	400	380	380	342	360	330	290	275	285	280	285	
LQ	320	340	360	370	360	360	330	340	290	270	260	270	260	263	
QR	30	30	30	30	20	20	12	20	40	20	15	15	20	22	

* Tabulation of 350 = factor of 3.5.

IONOSPHERIC DATA

Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
330	290	260	275	260	260	270	270	290	300	S	S	F	F	F	F
350	300	260	280	260	280	280	280	290	310	S	S	S	F	F	F
320	270	260	265	260	270	280	280	280	310	S	S	310	300	300	F
360	290M	260	270	260	310	300	310	300	S	S	S	R	300	350	350
330	S	250	270	270	260	270	280	280	280	S	S	330	320	330	350
330	290	240	270	280	265	280	320	310	S	S	S	S	S	330	F
330	290	270	290	270	260	270	300	320	S	S	S	320	320	330	340
340	290	260	280	270	260	270	270	280	270	280	F	F	320	F	360
350	310	260	280	285	280	S	290	280	260	300	300	310	320	340	350
310	280	270	300	270	265	275	300	280	270	280	320	310	310	330	330
340	300	250	280	260	280	300	320	330	330	S	S	S	330	330	S
290C	260	270	280	290	300	310	320	310	S	S	S	S	U320S	320	340
290	265	270	280	280	260	290	360	350	350	320	320	290	330	350	350
340	290	270	260	270	270	295	310	335	350	330	350	340	345	330	U335S
290	270	290	270	270	290	270	300	330	S	U350S	340	320	340	340	310
300	250	270	290	265	280	280	300	320	S	S	S	330	350	S	S
290	290	260	250	260	280	280	330	300	320	320	S	F	F	F	F
320	280	250	280	280	S	280	320	330	330	S	320	F	F	F	F
280	250	265	C	275	280	280	320	U340S	S	S	C	S	F	F	F
R	270	C	S	270	260	280	300	300	280	280	300	S	F	F	F
320	280	250	260	260	270	290	300	S	S	S	S	330	350	330	U315C
320	280	S	260	260	260	280	U300S	S	S	S	S	320	U290S	290	S
310	S	250	280	310	310	U330S	S	S	S	S	330	315	280	350	360
370	280	260	300	280	S	R	S	U320S	S	S	S	S	350	315	320
380	280	A	280	270	290	U340S	S	S	S	S	S	S	S	S	340
300	270	280	295	320	320	S	350	S	S	S	S	S	375	360	S
320	290	275	U280S	S	295	280	300	S	S	S	S	S	340	350	340
350	270	280	270	285	270	280	310	S	S	S	S	310	F	F	310
320	300	260	275	270	275	280	S	S	S	S	S	340	S	S	F
375	260	280	280	280	270	270	305	S	S	S	S	S	340	340	310
	270	290	280	280	280	U300S	S	S	S	S	S	S	340	U330S	320
320	280	265	280	270	275	280	300	310	310	310	320	320	330	330	340
330	29	28	29	30	29	28	26	21	13	8	8	14	21	20	18
330	290	275	285	280	285	298	320	330	330	325	335	330	342	345	350
390	270	260	270	260	263	278	300	285	275	280	310	310	315	330	320
340	20	15	15	20	22	20	20	45	55	45	25	20	27	15	30

B

Characteristic: $h'F_2$

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 m

March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	-	-	-	-	-	-	-	-	-	300*	320	340	340	350
2	-	-	-	-	-	-	-	-	-	-	310	340	360	355
3	-	-	-	-	-	-	-	-	-	310	350	360	380	360
4	-	-	-	-	-	-	-	-	-	-	330	360	360	300
5	-	-	-	-	-	-	-	-	-	-	-	-	U310S	-
6	-	-	-	-	-	-	-	-	-	-	310	310	320	310
7	-	-	-	-	-	-	-	-	-	-	300	300	300	320
8	-	-	-	-	-	-	-	-	-	-	300	300	310	320
9	-	-	-	-	-	-	-	-	-	-	300	290	300	320
10	-	-	-	-	-	-	-	-	-	-	300	310	305	310
11	-	-	-	-	-	-	-	-	-	-	310	310	320	330
12	-	-	-	-	-	-	-	-	-	-	340	320	320	310
13	-	-	-	-	-	-	-	-	-	-	330	325	320	360
14	-	-	-	-	-	-	-	-	-	300	320	345	360	320
15	-	-	-	-	-	-	-	-	-	320	340	350	350	340
16	-	-	-	-	-	-	-	-	-	320	350	330	380	330
17	-	-	-	-	-	-	-	-	-	330	300	330	360	330
18	-	-	-	-	-	-	-	-	-	320	320	320	310	350
19	-	-	-	-	-	-	-	-	-	320	380	-	360	340
20	-	-	-	-	-	-	-	-	-	335	C	360	420	380
21	-	-	-	-	-	-	-	-	-	310	335	350	340	330
22	-	-	-	-	-	-	-	-	-	305	340	350	U340S	335
23	-	-	-	-	-	-	-	-	280	300	300	330	300	390
24	-	-	-	-	-	-	-	-	-	310	350	320	320	300
25	-	-	-	-	-	-	-	-	E350A	350	A	320	310	270
26	-	-	-	-	-	-	-	-	-	310	300	280	300	280
27	-	-	-	-	-	-	-	-	-	290	310	E330S	310	310
28	-	-	-	-	-	-	-	-	-	310	340	370	350	350
29	-	-	-	-	-	-	-	-	-	310	360	E350S	430	350
30	-	-	-	-	-	-	-	-	-	-	360	400	E400S	E360A
31	-	-	-	-	-	-	-	-	-	-	340	310	315	310
Median	-	-	-	-	-	-	-	-	315	310	330	330	320	330
Count	-	-	-	-	-	-	-	-	2	18	29	29	31	30
UQ	-	-	-	-	-	-	-	-	-	320	345	350	360	350
LQ	-	-	-	-	-	-	-	-	-	305	305	310	310	310
QR	-	-	-	-	-	-	-	-	-	15	40	40	50	40

* Tabulation of 300 = 300 km.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	300*	320	340	340	350	340	-	E380A	-	-	-	-	-	-	-
-	-	310	340	360	355	-	310	-	-	-	-	-	-	-	-
-	310	350	360	380	360	330	310	-	-	-	-	-	-	-	-
-	-	330	360	360	300	310	-	-	-	-	-	-	-	-	-
-	-	-	-	U310S	-	-	290	-	-	-	-	-	-	-	-
-	-	310	310	320	310	E310A	-	-	-	-	-	-	-	-	-
-	-	300	300	300	320	-	280	-	-	-	-	-	-	-	-
-	-	300	300	310	320	300	-	-	-	-	-	-	-	-	-
-	-	300	290	300	320	300	-	-	-	-	-	-	-	-	-
-	-	300	310	305	310	320	-	-	-	-	-	-	-	-	-
-	-	310	310	320	330	310	280	-	-	-	-	-	-	-	-
-	-	340	320	320	310	280	260	-	-	-	-	-	-	-	-
-	-	330	325	320	360	290	255	-	-	-	-	-	-	-	-
-	300	320	345	360	320	300	270	-	-	-	-	-	-	-	-
-	320	340	350	350	340	300	300	265	250	-	-	-	-	-	-
-	320	350	330	380	330	320	300	-	-	-	-	-	-	-	-
-	330	300	330	360	330	330	270	-	-	-	-	-	-	-	-
-	320	320	320	310	350	300	280	240	-	-	-	-	-	-	-
-	320	380	-	360	340	300	270	-	-	-	-	-	-	-	-
-	335	C	360	420	380	330	300	-	-	-	-	-	-	-	-
-	310	335	350	340	330	315	300	-	-	-	-	-	-	-	-
-	305	340	350	U340S	335	E300A	-	-	-	-	-	-	-	-	-
280	300	300	330	300	390	270	-	-	-	-	-	-	-	-	-
-	310	350	320	320	300	270	-	-	-	-	-	-	-	-	-
E350A	350	A	320	310	270	270	270	-	-	-	-	-	-	-	-
-	310	300	280	300	280	310	270	260	-	-	-	-	-	-	-
-	290	310	E330S	310	310	300	260	280	-	-	-	-	-	-	-
-	310	340	370	350	350	310	300	280	-	-	-	-	-	-	-
-	310	360	E350S	430	350	E310S	310	300	-	-	-	-	-	-	-
-	-	360	400	E400S	E360A	320	260	-	-	-	-	-	-	-	-
-	-	340	310	315	310	300	275	-	-	-	-	-	-	-	-
315	310	330	330	320	330	310	280	280	250	-	-	-	-	-	-
2	18	29	29	31	30	28	22	7	1	-	-	-	-	-	-
-	320	345	350	360	350	320	300	300	-	-	-	-	-	-	-
-	305	305	310	310	310	300	270	260	-	-	-	-	-	-	-
-	15	40	40	50	40	20	30	40	-	-	-	-	-	-	-

B

Characteristic: h'F

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

Observed at:
Bankok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	220*	200	175	E210S	210	A	E280S	E230S	E210A	200	190	E220A	E200A	A
2	270	U240F	200	190	200	E230S	S	E230S	210	210	200	200	180	170
3	230	235	220	200	180	E220S	A	E220S	E210S	200	180	180	180	170
4	E260S	E250S	230	190	E180E	E230S	S	E220S	210	200	200	200	180	160
5	E230A	220	250	250	E300S	A	E300S	230	200	190	E200A	E175A	E200A	E200A
6	230	E210S	200	200	A	A	S	E230A	E200A	E200A	200	180	E200A	E230A
7	230	230	200	180	200	E220S	E280S	220	200	E180A	200	180	200	170
8	E210S	210	200	200	E300A	E240S	E240A	220	200	200	A	A	E200A	180
9	210	200	200	200	200	200	E250S	E220S	200	200	190	E200A	E200A	A
10	200	190	195	190	E210S	A	A	215	E210A	200	190	200	E200B	E180B
11	E210S	200	190	200	200	E205S	E300S	E220S	E200S	190	190	180	170	E200B
12	E260S	230	200	200	E210A	E240A	E240S	210	200	190	E190B	180	180	E200B
13	E210S	210	200	200	240	S	E280S	220	200	180	180	180	170	170
14	E210S	200	200	220	B	S	E280S	230	200	200	E200A	180	180	180
15	E230S	220	200	210	A	S	E270S	E250S	E200S	210	S	S	S	S
16	E210S	230	200	200	230	B	S	E200S	E200A	180	180	E270B	E200B	E200B
17	E250S	230	200	190	E225E	S	E250S	220	200	200	180	180	170	170
18	260	250	220	180	220	E240S	E250S	220	210	200	E200A	E200A	180	180
19	280	250	200	180	220	S	E250S	220	200	E200A	E200A	C	180	E200A
20	280	240	200	200	B	B	230	E210A	200	E200A	C	175	E190A	E180A
21	230	240	210	190	200	210	E250S	220	200	180	170	180	180	170
22	E260A	220	190	190	B	S	E250S	220	E220A	E220A	E310A	E270A	E200A	A
23	230	180	E270A	A	S	E240A	E210A	200	200	E200A	E200A	A	A	180
24	E200S	200	230	230	E270S	E250S	220	200	200	E220A	200	180	200	E200B
25	220	200	E220B	E220B	E230A	E230S	E220A	E250A	A	A	A	A	E200A	210
26	250	220	190	200	230	A	A	230	200	200	200	200	B	B
27	250	220	200	200	B	B	S	230	200	200	E200A	B	B	B
28	220	200	200	A	A	A	A	E230A	E220A	E200A	B	E200A	A	A
29	E250S	220	200	200	200	B	A	220	E210A	E210A	180	200	E200A	E170A
30	350	300	240	220	B	B	S	220	E200S	E230A	180	E200B	B	A
31	E260S	250	210	200	200	E250S	E240S	220	E220A	180	200	E180A	200	E190A
Median	230	220	200	200	220	230	250	220	200	200	200	180	200	180
Count	31	31	31	29	22	14	20	31	30	30	26	25	25	23
UQ	260	240	220	205	230	240	280	230	210	200	200	200	200	200
LQ	210	200	200	190	200	220	240	220	200	190	180	180	180	170
QR	50	40	20	15	30	20	40	10	10	10	20	20	20	30

* Tabulation of 220 = 220 km.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
30S	E210A	200	190	E220A	E200A	A	E220A	E260S	A	E260S	240	250	260	U260F	250	250
30S	210	210	200	200	180	170	E280S	160	E200B	E200A	230	250	E310S	300	260	U200F
20S	E210S	200	180	180	180	170	170	170	180	E220S	E220S	200	E230S	E230S	E240S	250
20S	210	200	200	200	180	160	180	170	200	E230S	E250S	E280S	E300S	220	200	E220A
30	200	190	E200A	E175A	E200A	E200A	E300S	E200S	E240S	E240S	240	220	230	210	220	E220S
30A	E200A	E200A	200	180	E200A	E230A	A	200	E230A	E250S	230	240	220	240	210	210
10	200	E180A	200	180	200	170	170H	200	E220S	E250S	230	240	240	220	220	E210A
20	200	200	A	A	E200A	180	E200A	E170A	E200A	210	230	E270S	250	220	220	200
20S	200	200	190	E200A	E200A	A	A	E200A	E220A	200	230	E230S	E220S	E220A	210	210
15	E210A	200	190	200	E200B	E180B	E200B	E180B	200	E220A	240	230	E210S	200	E220S	E220S
20S	E200S	190	190	180	170	E200B	E170B	E200A	200	210	E230S	220	E210S	E230S	230	E260S
10	200	190	E190B	180	180	E200B	200	180	200	220	E230S	E230S	E230S	E230S	230	230
30	200	180	180	180	170	170	E200B	200	E230A	E230S	E240S	E270S	E300S	260	E220A	E210S
30	200	200	E200A	180	180	180	175	180	200	235	E230S	E240S	E230S	220	E220A	E220S
0S	E200S	210	S	S	S	S	S	S	S	S	230	E230S	E230S	220	E220S	E250S
00S	E200A	180	180	E270B	E200B	E200B	E270S	E200S	E210S	E230S	230	E240S	E230S	210	E240A	E260S
30	200	200	180	180	170	170	B	190	180	230	240	270	230	230	230	260
30	210	200	E200A	E200A	180	180	170	200	200	200	220	230	240	220	250	270
10	200	E200A	E200A	C	180	E200A	E230A	180	180	200	E230A	C	250	270	250	270
10A	200	E200A	C	175	E190A	E180A	E200A	180	180	E190A	230	E230S	U350F	260	250	220
10	200	180	170	180	180	170	180	200	E220A	E240A	230	E220S	230	200	E240A	E260A
10	E220A	E220A	E310A	E270A	E200A	A	A	E180A	200	230	E240S	230	E230A	E250S	E290S	290
10	200	E200A	E200A	A	A	180	200	200	E210A	240	E230A	230	E270A	230	E240A	E230S
10	200	E220A	200	180	200	E200B	180	E200A	210	230	E250S	E250A	E220A	230	E270A	260
10A	A	A	A	A	E200A	210	190	E220A	E230A	E250A	E250A	E260A	E240A	220	220	230
10	200	200	200	200	B	B	E260C	E220A	E200A	E210S	240	220	220	210	200	E210S
10	200	200	E200A	B	B	B	E250S	180	200	E200S	220	230	250	230	210	E230A
10A	E220A	E200A	B	E200A	A	A	170	E180S	200	E230S	220	250	E260S	260	240	280
10	E210A	E210A	180	200	E200A	E170A	160	B	B	200	220	240	E270S	S	260	320
10	E200S	E230A	180	E200B	B	A	E180A	170	200	210	230	E230S	210	200	E210S	250
10	E220A	180	200	E180A	200	E190A	E190S	185	200	E200S	220	250	E250S	240	230	E230S
10	200	200	200	180	200	180	195	190	200	225	230	240	230	230	230	230
11	30	30	26	25	25	23	26	29	28	30	31	30	31	30	31	31
10	210	200	200	200	200	200	220	200	215	240	240	250	260	250	250	260
10	200	190	180	180	180	170	175	180	200	200	230	230	230	220	220	220
10	10	10	20	20	20	30	45	20	15	40	10	20	30	30	30	40

B

Characteristic: f_oF1

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minu
March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	-	-	-	-	-	-	-	-	L	U043L	043*	045	045	A
2	-	-	-	-	-	-	-	-	L	L	044	045	045	04
3	-	-	-	-	-	-	-	-	-	U043L	044	043	044	04
4	-	-	-	-	-	-	-	-	L	L	U044L	045	045	04
5	-	-	-	-	-	-	-	-	L	L	L	L	046	L
6	-	-	-	-	-	-	-	-	L	L	U044L	045	046	04
7	-	-	-	-	-	-	-	-	L	L	044	044	045	04
8	-	-	-	-	-	-	-	-	L	L	A	A	045	04
9	-	-	-	-	-	-	-	-	L	L	U043L	045	045	A
10	-	-	-	-	-	-	-	L	L	L	043	044	045	04
11	-	-	-	-	-	-	-	-	L	L	044	045	045	04
12	-	-	-	-	-	-	-	-	L	L	045	045	045	04
13	-	-	-	-	-	-	-	-	-	L	044	044	045	U04
14	-	-	-	-	-	-	-	-	L	044	044	045	045	04
15	-	-	-	-	-	-	-	-	L	044	S	S	S	S
16	-	-	-	-	-	-	-	-	L	042	044	044	045	04
17	-	-	-	-	-	-	-	-	L	045	043	045	044	04
18	-	-	-	-	-	-	-	-	L	045	044	044	S	04
19	-	-	-	-	-	-	-	L	L	043	044	C	045	04
20	-	-	-	-	-	-	-	L	B	043	C	S	R	04
21	-	-	-	-	-	-	-	L	L	043	044	S	044	04
22	-	-	-	-	-	-	-	L	L	043	A	U045A	S	A
23	-	-	-	-	-	-	L	L	041	043	045	A	A	04
24	-	-	-	-	-	-	-	L	L	044	045	D045S	D045S	04
25	-	-	-	-	-	-	L	L	A	A	A	A	045	04
26	-	-	-	-	-	-	-	-	-	043	044	045	B	B
27	-	-	-	-	-	-	-	-	L	U043L	045	B	B	B
28	-	-	-	-	-	-	-		L	U045L	B	R	A	A
29	-	-	-	-	-	-	-	-	L	U043L	R	S	S	R
30	-	-	-	-	-	-	-	-	-	L	044	R	B	A
31	-	-	-	-	-	-	-	-	L	L	045	045	045	04
Median	-	-	-	-	-	-	-	-	041	043	044	045	045	045
Count	-	-	-	-	-	-	-	-	1	17	23	19	21	21
UQ	-	-	-	-	-	-	-	-	-	044	045	045	045	045
LQ	-	-	-	-	-	-	-	-	-	043	044	044	045	044
QR	-	-	-	-	-	-	-	-	-	1	1	1	-	1

* Tabulation of 043 = 4.3 Mc.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
L	U043L	043*	045	045	A	045	L	A	S	-	-	-	-	-	-
L	L	044	045	045	045	L	045	L	L	-	-	-	-	-	-
-	U043L	044	043	044	045	044	043	L	-	-	-	-	-	-	-
L	L	U044L	045	045	045	045	L	L	-	-	-	-	-	-	-
L	L	L	L	046	L	L	043	L	-	-	-	-	-	-	-
L	L	U044L	045	046	043	A	L	L	-	-	-	-	-	-	-
L	L	044	044	045	043	L	U043L	L	-	-	-	-	-	-	-
L	L	A	A	045	044	045	L	L	-	-	-	-	-	-	-
L	L	U043L	045	045	A	A	L	L	L	-	-	-	-	-	-
L	L	043	044	045	045	045	L	-	-	-	-	-	-	-	-
L	L	044	045	045	047	045	041	L	L	-	-	-	-	-	-
L	L	045	045	045	044	045	040	L	L	-	-	-	-	-	-
-	L	044	044	045	U047S	043	U042L	L	L	-	-	-	-	-	-
L	044	044	045	045	044	044	U043L	L	-	-	-	-	-	-	-
L	044	S	S	S	S	S	S	S	S	-	-	-	-	-	-
L	042	044	044	045	045	045	044	L	-	-	-	-	-	-	-
L	045	043	045	044	045H	B	043	L	L	-	-	-	-	-	-
L	045	044	044	S	045	044	043	040	L	-	-	-	-	-	-
L	043	044	C	045	045	043	042	L	L	-	-	-	-	-	-
B	043	C	S	R	044	043	043	L	L	-	-	-	-	-	-
L	043	044	S	044	045	044	042	L	L	L	-	-	-	-	-
L	043	A	U045A	S	A	A	L	L	-	-	-	-	-	-	-
041	043	045	A	A	045	044	L	L	L	-	-	-	-	-	-
L	044	045	D045S	D045S	045	043	L	L	-	-	-	-	-	-	-
A	A	A	A	045	044	043	043	L	L	-	-	-	-	-	-
-	043	044	045	B	B	S	045	U042L	-	-	-	-	-	-	-
L	U043L	045	B	B	B	S	U043L	043	L	-	-	-	-	-	-
L	U045L	B	R	A	A	045	043	U044L	L	-	-	-	-	-	-
L	U043L	R	S	S	R	045	R	B	L	-	-	-	-	-	-
-	L	044	R	B	A	R	041	L	L	-	-	-	-	-	-
L	L	045	045	045	045	045	044	L	L	-	-	-	-	-	-
041	043	044	045	045	045	045	043	043	-	-	-	-	-	-	-
1	17	23	19	21	21	20	20	4	-	-	-	-	-	-	-
-	044	045	045	045	045	045	043	044	-	-	-	-	-	-	-
-	043	044	044	045	044	044	042	041	-	-	-	-	-	-	-
-	1	1	1	-	1	1	1	3	-	-	-	-	-	-	-

B

Characteristic: M(3000)F1

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 mi
March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	-	-	-	-	-	-	-	-	L	U380L	400*	410	410	A
2	-	-	-	-	-	-	-	-	L	L	400	410	420	420
3	-	-	-	-	-	-	-	-	-	U390L	400	420	410	410
4	-	-	-	-	-	-	-	-	L	L	U390L	410	410	400
5	-	-	-	-	-	-	-	-	L	L	L	L	390	L
6	-	-	-	-	-	-	-	-	L	L	U400L	410	395	420
7	-	-	-	-	-	-	-	-	L	L	400	420	420	420
8	-	-	-	-	-	-	-	-	L	L	A	A	410	410
9	-	-	-	-	-	-	-	L	L	L	U400L	400	400	A
10	-	-	-	-	-	-	-	-	L	L	420	400	400	400
11	-	-	-	-	-	-	-	-	L	L	410	410	415	385
12	-	-	-	-	-	-	-	-	L	L	390	400	400	405
13	-	-	-	-	-	-	-	-	-	L	410	410	410	U380S
14	-	-	-	-	-	-	-	-	L	390	400	410	420	420
15	-	-	-	-	-	-	-	-	L	390	S	S	S	S
16	-	-	-	-	-	-	-	-	L	U390L	400	400	400	400
17	-	-	-	-	-	-	-	-	L	370	410	410	420	420H
18	-	-	-	-	-	-	-	-	L	370	370	410	S	400
19	-	-	-	-	-	-	-	L	L	400	410	C	410	420
20	-	-	-	-	-	-	-	L	B	390	C	S	R	410
21	-	-	-	-	-	-	-	L	L	U390L	410	S	410	400
22	-	-	-	-	-	-	-	L	L	390	A	U370A	S	A
23	-	-	-	-	-	-	L	L	390	390	410	A	A	385
24	-	-	-	-	-	-	-	L	L	380	410	S	S	400
25	-	-	-	-	-	-	L	L	A	A	A	A	380	390
26	-	-	-	-	-	-	-	-	-	370	400	410	B	B
27	-	-	-	-	-	-	-	-	L	U380L	390	B	B	B
28	-	-	-	-	-	-	-	-	L	U380L	B	R	A	A
29	-	-	-	-	-	-	-	-	L	U390L	R	S	S	R
30	-	-	-	-	-	-	-	-	-	L	410	R	B	A
31	-	-	-	-	-	-	-	-	L	L	390	400	400	410
Median	-	-	-	-	-	-	-	-	390	390	400	410	410	405
Count	-	-	-	-	-	-	-	-	1	17	23	18	20	21
UQ	-	-	-	-	-	-	-	-	-	390	410	410	412	420
LQ	-	-	-	-	-	-	-	-	-	370	400	400	400	400
QR	-	-	-	-	-	-	-	-	-	20	10	10	12	20

* Tabulation of 400 = factor of 4.0.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
March 1964

07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
-	L	U380L	400*	410	410	A	390	L	A	S	-	-	-	-	-	-
	L	L	400	410	420	420	L	380	L	L	-	-	-	-	-	-
	-	U390L	400	410	410	410	410	395	L	-	-	-	-	-	-	-
	L	L	U390L	410	410	400	390	L	L	-	-	-	-	-	-	-
	L	L	L	L	390	L	L	390	L	-	-	-	-	-	-	-
	L	L	U400L	410	395	420	A	L	L	-	-	-	-	-	-	-
	L	L	400	420	420	420	L	U390L	L	-	-	-	-	-	-	-
	L	L	A	A	410	410	410	L	L	-	-	-	-	-	-	-
L	L	L	U400L	400	400	A	A	L	L	L	-	-	-	-	-	-
	L	L	420	400	400	400	400	L	-	-	-	-	-	-	-	-
	L	L	410	410	415	385	400	400	L	L	-	-	-	-	-	-
	L	L	390	400	400	405	395	400	L	L	-	-	-	-	-	-
	-	L	410	410	410	U380S	430	U410L	L	L	-	-	-	-	-	-
	L	390	400	410	420	420	420	U390L	L	-	-	-	-	-	-	-
	L	390	S	S	S	S	S	S	S	S	-	-	-	-	-	-
	L	U390L	400	400	400	400	390	390	L	-	-	-	-	-	-	-
	L	370	410	410	420	420H	B	390	L	L	-	-	-	-	-	-
	L	370	370	410	S	400	410	395	400	L	-	-	-	-	-	-
	L	400	410	C	410	420	410	400	L	L	-	-	-	-	-	-
	B	390	C	S	R	410	420	410	L	L	-	-	-	-	-	-
	I	U390L	410	S	410	400	400	390	L	L	L	-	-	-	-	-
	L	3[illegible]	A	U370A	S	A	A	L	L	-	-	-	-	-	-	-
	390	3[illegible]	410	A	A	385	380	L	L	L	-	-	-	-	-	-
	L	380	410	S	S	400	400	L	L	-	-	-	-	-	-	-
	A	A	A	A	380	390	395	400	L	L	-	-	-	-	-	-
	-	370	400	410	B	B	S	390	U380L	-	-	-	-	-	-	-
	L	U380L	390	B	B	B	S	U390L	390	I	-	-	-	-	-	-
	L	U380L	B	R	A	A	410	410	U390L	L	-	-	-	-	-	-
	L	U390L	R	S	S	R	420	B	B	L	-	-	-	-	-	-
	-	L	410	R	B	A	R	410	L	L	-	-	-	-	-	-
	L	L	390	400	400	410	400	390	L	L	-	-	-	-	-	-
	390	390	400	410	410	405	400	392	390	-	-	-	-	-	-	-
	1	17	23	18	20	21	20	20	4	-	-	-	-	-	-	-
	-	390	410	410	412	420	410	400	395	-	-	-	-	-	-	-
	-	370	400	400	400	400	395	390	385	-	-	-	-	-	-	-
	-	20	10	10	12	20	15	10	10	-	-	-	-	-	-	-

B

Characteristic: f_oE

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 min
March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long.100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	-	-	-	-	-	-	-	-	A	A	A	A	A	B
2	-	-	-	-	-	-	-	-	S	S	R	B	B	B
3	-	-	-	-	-	-	-	-	-	R	R	R	B	B
4	-	-	-	-	-	-	-	-	S	S	B	A	B	B
5	-	-	-	-	-	-	-	-	A	A	A	A	A	B
6	-	-	-	-	-	-	-	-	A	A	A	A	A	B
7	-	-	-	-	-	-	-	-	A	A	A	A	B	B
8	-	-	-	-	-	-	-	-	A	R	B	B	A	A
9	-	-	-	-	-	-	-	S	A	S	S	B	B	B
10	-	-	-	-	-	-	-	-	S	S	B	B	B	B
11	-	-	-	-	-	-	-	-	S	S	S	S	B	B
12	-	-	-	-	-	-	-	-	C	B	R	R	B	B
13	-	-	-	-	-	-	-	-	-	S	S	B	B	S
14	-	-	-	-	-	-	-	-	S	S	A	A	A	A
15	-	-	-	-	-	-	-	-	S	B	S	S	S	S
16	-	-	-	-	-	-	-	-	S	A	B	B	B	B
17	-	-	-	-	-	-	-	-	A	C	A	R	B	R
18	-	-	-	-	-	-	-	-	S	A	A	A	R	A
19	-	-	-	-	-	-	-	S	S	A	A	C	A	A
20	-	-	-	-	-	-	-	A	B	A	C	A	A	A
21	-	-	-	-	-	-	-	S	S	A	A	B	R	B
22	-	-	-	-	-	-	-	A	A	A	B	A	B	B
23	-	-	-	-	-	-	A	A	A	A	A	B	A	B
24	-	-	-	-	-	-	-	S	B	A	B	B	B	S
25	-	-	-	-	-	-	B	S	B	B	B	B	B	B
26	-	-	-	-	-	-	-	-	-	B	B	B	B	B
27	-	-	-	-	-	-	-	-	B	B	A	B	B	B
28	-	-	-	-	-	-	-	-	A	A	A	A	A	A
29	-	-	-	-	-	-	-	-	A	A	B	B	A	A
30	-	-	-	-	-	-	-	-	-	A	A	B	A	A
31	-	-	-	-	-	-	-	-	A	B	B	A	A	A
Median	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Count	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UQ	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LQ	-	-	-	-	-	-	-	-	-	-	-	-	-	-
QR	-	-	-	-	-	-	-	-	-	-	-	-	-	-

* Tabulation of 290 = 2.90 Mc.

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	A	A	A	A	A	B	B	S	S	S	-	-	-	-	-	-
	S	S	R	B	B	B	B	B	B	A	-	-	-	-	-	-
	-	R	R	R	B	B	B	B	S	-	-	-	-	-	-	-
	S	S	B	A	B	B	B	B	B	-	-	-	-	-	-	-
	A	A	A	A	A	B	S	S	S	-	-	-	-	-	-	-
	A	A	A	A	A	B	B	A	S	-	-	-	-	-	-	-
	A	A	A	A	B	B	B	B	S	-	-	-	-	-	-	-
	A	R	B	B	A	A	A	A	A	-	-	-	-	-	-	-
	A	S	S	B	B	B	B	B	B	A	-	-	-	-	-	-
	S	S	B	B	B	B	B	B	-	-	-	-	-	-	-	-
	S	S	S	S	B	B	B	B	B	A	-	-	-	-	-	-
	C	B	R	R	B	B	B	B	B	B	-	-	-	-	-	-
	-	S	S	B	B	S	B	B	A	S	-	-	-	-	-	-
	S	S	A	A	A	A	B	B	B	-	-	-	-	-	-	-
	S	B	S	S	S	S	S	S	S	S	-	-	-	-	-	-
	S	A	B	B	B	B	S	B	S	-	-	-	-	-	-	-
	A	C	A	R	B	R	B	B	B	S	-	-	-	-	-	-
	S	A	A	A	R	A	B	A	B	S	-	-	-	-	-	-
	S	A	A	C	A	A	A	B	A	S	-	-	-	-	-	-
	B	A	C	A	A	A	A	R	A	S	-	-	-	-	-	-
	S	A	A	B	R	B	B	B	A	S	S	-	-	-	-	-
	A	A	B	A	B	B	B	B	-	-	-	-	-	-	-	-
	A	A	A	B	A	B	B	R	A	A	-	-	-	-	-	-
	B	A	B	B	B	S	B	R	R	-	-	-	-	-	-	-
	B	B	B	B	B	B	R	A	A	A	-	-	-	-	-	-
	-	B	B	B	B	B	B	A	B	-	-	-	-	-	-	-
	B	B	A	B	B	B	S	S	S	S	-	-	-	-	-	-
	A	A	A	A	A	A	A	S	S	S	-	-	-	-	-	-
	A	A	B	B	A	A	A	B	B	S	-	-	-	-	-	-
	-	A	A	B	A	A	A	A	290*	S	-	-	-	-	-	-
	A	B	B	A	A	A	A	S	R	S	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

B

Characteristic: h'E

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 mi

March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Date \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	-	-	-	-	-	-	-	-	S	S	A	100*	100	B
2	-	-	-	-	-	-	-	-	S	S	100	B	B	B
3	-	-	-	-	-	-	-	-	-	100	105	100	B	B
4	-	-	-	-	-	-	-	-	S	S	B	E105S	B	B
5	-	-	-	-	-	-	-	-	A	100	100	100	100	B
6	-	-	-	-	-	-	-	-	A	A	A	110	A	B
7	-	-	-	-	-	-	-	-	A	A	A	A	B	B
8	-	-	-	-	-	-	-	-	100	E110S	B	B	100	100
9	-	-	-	-	-	-	-	S	S	S	S	B	B	B
10	-	-	-	-	-	-	-	-	S	100	B	B	B	B
11	-	-	-	-	-	-	-	-	S	S	S	S	B	B
12	-	-	-	-	-	-	-	-	C	B	110	100	B	B
13	-	-	-	-	-	-	-	-	-	S	S	B	B	S
14	-	-	-	-	-	-	-	-	S	S	A	A	A	A
15	-	-	-	-	-	-	-	-	S	B	S	S	S	S
16	-	-	-	-	-	-	-	-	S	110	B	B	B	B
17	-	-	-	-	-	-	-	-	E120S	C	100	100	B	100
18	-	-	-	-	-	-	-	-	S	E105S	A	100	100	A
19	-	-	-	-	-	-	-	S	S	A	E110S	C	A	A
20	-	-	-	-	-	-	-	A	B	A	C	A	A	A
21	-	-	-	-	-	-	-	S	S	A	A	B	100	B
22	-	-	-	-	-	-	-	100	100	100	B	100	B	B
23	-	-	-	-	-	-	A	A	A	A	100	B	100	B
24	-	-	-	-	-	-	-	S	B	100	B	B	B	S
25	-	-	-	-	-	-	B	S	B	B	B	B	B	B
26	-	-	-	-	-	-	-	-	-	B	B	B	B	B
27	-	-	-	-	-	-	-	-	B	B	A	B	B	B
28	-	-	-	-	-	-	-	-	A	A	A	A	A	A
29	-	-	-	-	-	-	-	-	A	A	B	B	A	A
30	-	-	-	-	-	-	-	-	-	A	A	B	A	A
31	-	-	-	-	-	-	-	-	A	B	B	A	A	A
Median	-	-	-	-	-	-	-	100	100	100	100	100	100	100
Count	-	-	-	-	-	-	-	1	3	8	7	9	6	2
UQ	-	-	-	-	-	-	-	-	120	107	110	102	100	100
LQ	-	-	-	-	-	-	-	-	100	100	100	100	100	100
QR	-	-	-	-	-	-	-	-	20	7	10	2	-	-

* Tabulation of 100 = 100 km.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
S	S	A	100*	100	B	B	S	S	S	–	–	–	–	–	–
S	S	100	B	B	B	B	B	B	E120S	–	–	–	–	–	–
–	100	105	100	B	B	100	B	S	–	–	–	–	–	–	–
S	S	B	E105S	B	B	B	B	B	–	–	–	–	–	–	–
A	100	100	100	100	B	S	S	S	–	–	–	–	–	–	–
A	A	A	110	A	B	B	100	S	–	–	–	–	–	–	–
A	A	A	A	B	B	B	B	S	–	–	–	–	–	–	–
100	E110S	B	B	100	100	B	100	A	–	–	–	–	–	–	–
S	S	S	B	B	B	B	B	B	A	–	–	–	–	–	–
S	100	B	B	B	B	B	B	–	–	–	–	–	–	–	–
S	S	S	S	B	B	B	B	B	A	–	–	–	–	–	–
C	B	110	100	B	B	B	B	B	B	–	–	–	–	–	–
–	S	S	B	B	S	B	B	B	S	–	–	–	–	–	–
S	S	A	A	A	A	B	B	B	–	–	–	–	–	–	–
S	B	S	S	S	S	S	S	S	S	–	–	–	–	–	–
S	110	B	B	B	B	S	B	S	–	–	–	–	–	–	–
E120S	C	100	100	B	100	B	B	B	S	–	–	–	–	–	–
S	E105S	A	100	100	A	B	A	B	S	–	–	–	–	–	–
S	A	E110S	C	A	A	A	B	A	S	–	–	–	–	–	–
B	A	C	A	A	A	A	E100A	A	S	–	–	–	–	–	–
S	A	A	B	100	B	B	B	A	S	S	–	–	–	–	–
100	100	B	100	B	B	B	B	–	–	–	–	–	–	–	–
A	A	100	B	100	B	B	100	A	A	–	–	–	–	–	–
B	100	B	B	B	S	B	100	110	–	–	–	–	–	–	–
B	B	B	B	B	B	100	100	B	S	–	–	–	–	–	–
–	B	B	B	B	B	B	100	B	–	–	–	–	–	–	–
B	B	A	B	B	B	S	S	S	S	–	–	–	–	–	–
A	A	A	A	A	A	A	S	S	S	–	–	–	–	–	–
A	A	B	B	A	A	A	B	B	S	–	–	–	–	–	–
–	A	A	B	A	A	A	A	100	100	–	–	–	–	–	–
A	B	B	A	A	A	A	S	110	S	–	–	–	–	–	–
100	100	100	100	100	100	100	100	110	110	–	–	–	–	–	–
3	8	7	9	6	2	2	7	3	2	–	–	–	–	–	–
120	107	110	102	100	100	100	100	110	120	–	–	–	–	–	–
100	100	100	100	100	100	100	100	100	100	–	–	–	–	–	–
20	7	10	2	–	–	–	–	10	20	–	–	–	–	–	–

B

Characteristic: f_bE_s

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minu

March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	-	017*	B	B	-	-	-	-	-	034	-	042	040	045
2	027	026	026	B	B	-	S	S	-	-	S	B	B	B
3	020	-	B	B	B	-	-	S	S	S	G	G	B	B
4	S	S	B	B	B	S	S	S	S	S	B	B	B	B
5	020	B	B	B	B	-	019	025	028	B	037	G	-	-
6	020	-	B	-	-	-	S	025	030	033	-	-	037	041
7	S	B	B	B	B	B	S	023M	028	030	035	036M	B	B
8	S	B	B	B	018	-	020	M	030	-	043M	045	040	037
9	020	S	B	B	S	S	S	M	028	S	S	037	-	060M
10	B	-	015	B	S	-	-	S	031	S	B	B	B	B
11	B	-	B	-	S	S	S	S	S	S	S	S	B	B
12	-	B	B	B	016	017	-	S	029	B	G	G	B	B
13	S	B	B	B	-	S	S	S	S	B	S	B	B	B
14	S	B	B	B	B	S	S	B	S	B	038	037	035	038
15	S	B	B	B	-	S	S	S	S	B	S	S	S	S
16	S	B	B	B	B	B	S	S	030	M	B	B	B	B
17	S	B	B	B	B	S	S	027	031	C	-	S	B	G
18	S	S	B	B	B	-	-	024	032	033	040	-	S	-
19	019	-	B	B	S	S	S	S	S	035	040M	C	039	040
20	B	B	B	B	B	B	B	028	B	040	C	038	040	036
21	S	S	-	B	S	S	S	025	030	032	035	B	S	B
22	020	-	B	B	B	S	S	025	032	037	044	M	040	050M
23	-	B	-	-	S	029	028	033	033	037M	040M	050M	055M	B
24	S	B	S	B	S	S	025	031M	-	040	B	B	B	S
25	B	B	B	B	022	-	-	-	050M	051M	M	046	B	B
26	B	S	B	B	B	-	-	B	B	B	B	B	B	B
27	B	B	B	B	B	B	S	B	B	B	039	B	B	B
28	B	B	021	-	-	-	-	029	034	035	-	040	050	045
29	S	B	B	B	B	B	-	B	033	035	B	B	-	040
30	021	-	B	B	B	B	S	S	B	039	035	B	-	050
31	S	B	S	B	B	017	S	S	035	B	B	030	-	-
Median	020	022	021	-	018	017	022	025	031	035	039	039	040	041
Count	8	2	3	-	3	3	4	11	17	14	11	10	9	11
UQ	020	026	026	-	022	029	026	029	033	039	040	045	045	050
LQ	020	017	015	-	016	017	019	025	030	033	035	037	038	038
QR	-	9	11	-	6	12	7	4	3	6	5	8	7	12

* Tabulation of 017 = 1.7 Mc.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
4	-	042	040	045	045	040	050	-	S	S	S	S	S	033
	S	B	B	B	B	B	B	027	S	S	S	S	S	044
	G	G	B	B	G	B	S	S	S	S	S	S	S	S
	B	B	B	B	B	B	B	S	S	S	S	S	S	024
	037	G	-	-	S	S	S	S	S	S	S	S	S	-
3	-	-	037	041	058	-	S	S	035	035	S	-	030	020
0	035	036M	B	B	B	B	S	S	S	S	S	S	S	021
	043M	045	040	037	037	033	032	S	S	S	S	S	023	-
	S	037	-	060M	050	040	034	-	022	S	S	020	S	S
	B	B	B	B	B	B	B	027	028	B	S	S	-	S
	S	S	B	B	B	034	B	-	-	S	-	021	-	-
	G	G	B	B	B	B	B	B	S	S	S	S	S	S
	S	B	B	B	B	M	036	M	S	S	S	S	034	S
	038	037	035	038	B	B	B	S	S	S	S	S	033	S
	S	S	S	S	S	S	S	S	S	S	S	S	S	S
	B	B	B	B	S	B	S	S	S	S	S	S	026	-
	-	S	B	G	B	B	E	S	S	S	B	S	B	B
3	040	-	S	-	B	M	B	S	S	S	S	S	S	023
5	040M	C	039	040	044M	M	030	S	030	C	B	S	B	B
9	C	038	040	036	045	-	029M	026M	S	S	030	-	S	S
3	035	B	S	B	B	B	034	034	026	S	S	-	035	021
	044	M	040	050M	053	033	029	-	S	-	-	M	S	-
M	040M	050M	055M	B	B	G	029	027	023	032	050	027	023	S
	B	B	B	S	B	S	S	S	S	030	027	036	039	B
M	M	046	B	B	G	-	037	040	030	037	025	S	S	B
	B	B	B	B	B	038M	034	S	038	-	B	029	-	S
	039	B	B	B	S	S	S	S	S	S	S	S	-	030
	-	040	050	045	039	S	S	S	S	S	S	S	B	B
	B	B	-	040	-	B	B	S	S	S	S	S	S	022
	035	B	-	050	-	038	G	S	S	S	S	S	S	B
	B	039	-	-	-	S	B	S	S	S	S	-	S	S
	039	039	040	041	045	038	034	027	029	034	029	027	031	023
	11	10	9	11	8	7	11	6	8	4	4	5	8	9
	040	045	045	050	051	040	036	034	032	036	040	028	034	031
	035	037	038	038	041	033	029	027	024	031	026	021	024	021
	5	8	7	12	10	7	7	7	8	5	14	7	10	10

Characteristic: f_oE_s

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minu

March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Date \ Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13
1	035*	019	B	B	019	027	023	036	029	035	035	042	040	050M
2	055	050	040	B	B	034	S	S	028	035	S	B	B	B
3	026	019	B	B	B	026	029	S	S	S	G	G	B	B
4	S	S	B	B	B	S	S	S	S	S	E	E	B	B
5	027	B	B	B	B	025	021	028	035	B	037	G	036	035
6	029	020	B	B	055	040	S	035	040	040	037	036	037	041
7	S	B	B	B	B	B	S	038M	029	035	039	036M	B	B
8	S	B	B	B	040	044	038	027M	030	034	052M	050	038	037
9	029	S	B	B	S	S	S	030M	028	S	S	037	042	077M
10	B	034	029	B	S	019	034	S	031	S	B	B	B	B
11	B	017	B	017	S	S	S	S	S	S	S	S	B	B
12	035	B	B	B	022	024	021	S	029	B	G	G	B	B
13	S	B	B	B	037	S	S	S	S	B	S	B	B	B
14	S	B	B	B	B	S	S	B	S	B	038	037	040	040
15	S	B	B	B	020	S	S	S	S	B	S	S	S	S
16	S	B	B	B	B	B	S	S	031	033M	B	B	B	B
17	S	B	B	B	B	S	S	035	033	C	035	S	B	C
18	S	S	B	B	B	026	020	037	033	034	043	036	S	034
19	035	026	B	B	S	S	S	S	S	035	052M	C	010	040
20	B	B	B	B	B	B	S	035	B	045	C	068	065	038
21	S	S	024	B	S	S	S	025	030	040	038	B	S	B
22	045	028	B	B	B	S	S	026	033	037	044	044M	040	053M
23	026	S	037	028	S	035	034	036	036	045M	051M	053M	063M	B
24	S	B	S	B	S	S	030	037M	034	040	B	B	B	S
25	B	B	B	B	028	025	027	039	080M	087M	095M	062	B	B
26	B	S	B	B	B	022	028	B	B	B	B	B	B	B
27	B	B	B	B	B	B	S	B	B	B	039	B	B	B
28	B	B	051	075	027	042	027	038	040	042	040	040	054	045
29	S	B	B	B	B	B	032	B	035	035	B	B	053	040
30	039	024	B	B	B	B	S	S	B	040	045	B	040	055
31	S	B	S	B	B	022	S	S	040	B	B	039	040	038
Median	035	024	037	042	027	026	028	035	033	037	039	040	040	040
Count	11	9	5	4	8	14	13	15	20	17	16	13	14	14
UQ	039	031	045	065	038	035	033	037	036	041	048	051	053	050
LQ	027	019	026	033	021	024	022	028	029	035	037	036	040	037
QR	12	12	19	42	17	11	11	9	7	6	11	15	13	13

* Tabulation of 035 = 3.5 Mc.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
35	035	042	040	050M	055M	050	065	035	S	S	S	S	S	035
35	S	B	B	B	B	B	B	027	S	S	S	S	S	044
3	G	G	B	B	G	B	S	S	S	S	S	S	S	S
3	B	B	B	B	B	B	B	S	S	S	S	S	S	038
3	037	G	036	035	S	S	S	S	S	S	S	S	S	021
10	037	036	037	041	064	032	S	S	047	046	S	063	060	035
35	039	036M	B	B	B	B	S	S	S	S	S	S	S	043
34	052M	050	038	037	038	033	039	S	S	S	S	S	029	027
3	S	037	042	077M	100	073	042	025	026	S	S	027	S	S
3	B	B	B	B	B	B	B	077	045	B	S	S	029	S
3	S	S	B	B	B	034	B	031	029	S	032	033	-	019
3	G	G	B	B	B	B	B	B	S	S	S	S	S	S
3	S	B	B	B	B	036M	038	039M	S	S	S	S	040	S
3	038	037	040	040	B	B	B	S	S	S	S	S	033	S
3	S	S	S	S	S	S	S	S	S	S	S	S	S	S
3M	B	B	B	B	S	B	S	S	S	S	S	S	050	023
	035	S	B	G	B	B	B	S	S	S	B	S	B	B
4	043	036	S	034	B	032M	B	S	S	S	S	S	S	033
5	052M	C	040	040	053M	044M	036	S	037	C	B	S	B	B
5	C	068	065	036	045	024	038M	027M	S	S	045	021	S	S
0	036	B	S	B	B	B	034	034	026	S	S	034	045	038
7	044	044M	040	055M	063	034	035	039	S	030	035	040M	S	031
5M	051M	053M	063M	B	B	G	039	037	035	038	055	035	040	S
0	B	B	B	S	B	S	S	S	S	040	040	080	063	B
7M	095M	062	B	B	G	036	037	045	038	064	039	S	S	B
	B	B	B	B	B	039M	035	S	043	027	B	037	043	S
	039	B	B	B	S	S	S	S	S	S	S	S	030	047
2	040	040	054	045	044	S	S	S	S	S	S	S	B	B
5	B	B	053	040	037	B	B	S	S	S	S	S	S	036
0	045	B	040	055	040	038	G	S	S	S	S	S	S	B
	B	039	040	038	032	S	B	S	S	S	S	021	S	S
7	039	040	040	040	045	036	038	035	037	039	039	034	040	035
7	16	13	14	14	11	13	11	11	9	6	6	10	11	14
1	048	051	053	050	063	041	039	039	044	046	045	040	050	038
6	037	036	040	037	038	032	035	027	027	030	035	027	030	027
	11	15	13	13	25	9	4	12	17	16	10	13	20	11

B

Characteristic: $h'E_s$

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14
1	100*	090	B	B	120	110	120	120	120	120	130	120	115	100	100
2	100	090	090	B	B	105	S	S	140	120	S	B	B	B	B
3	100	100	B	B	B	100	090	S	S	S	G	G	B	B	G
4	S	S	B	B	B	S	S	S	S	S	B	B	B	B	B
5	090	B	B	B	B	100	100	130	100	B	120	G	110	110	S
6	090	100	B	100	090	100	S	110	105	120	100	120	100	110	100
7	S	B	B	B	B	B	S	110	100	100	100	100	B	B	B
8	S	B	B	B	100	100	100	110	130	130	115	100	100	105	100
9	090	S	B	B	S	S	S	110	120	S	S	100	110	100	100
10	B	110	105	B	S	090	090	S	120	S	B	B	B	B	B
11	B	120	B	110	S	S	S	S	S	S	S	S	B	B	B
12	100	B	B	B	120	115	120	S	140	B	G	G	B	B	B
13	S	B	B	B	110	S	S	S	S	B	S	B	B	B	B
14	S	B	B	B	B	S	S	B	S	B	100	100	100	090	B
15	S	B	B	B	100	S	S	S	S	B	B	S	S	S	B
16	S	B	B	B	B	B	S	S	120	140	B	B	B	B	S
17	S	B	B	B	B	S	S	110	120	C	100	S	B	G	B
18	S	S	B	B	B	110	100	110	105	100	100	100	S	090	B
19	100	100	B	B	S	S	S	S	S	110	110	C	110	100	100
20	B	B	B	B	B	B	B	100	B	100	C	100	100	090	090
21	S	S	110	B	S	S	S	120	120	100	100	B	S	C	B
22	090	100	B	B	B	S	S	120	110	110	110	100	110	100	100
23	090	B	090	100	S	100	110	110	110	110	105	105	105	B	B
24	S	B	S	B	S	S	100	120	120	120	B	B	B	S	B
25	B	B	B	B	105	110	115	110	100	102	100	110	B	B	G
26	B	S	B	B	B	120	100	B	B	B	B	B	B	B	B
27	B	B	B	B	B	B	S	B	B	B	100	B	B	B	S
28	B	B	100	100	100	100	100	100	100	100	100	100	100	100	100
29	S	B	B	B	B	B	090	B	100	100	B	B	100	090	090
30	100	100	B	B	B	B	S	S	B	100	100	B	100	090	090
31	S	B	S	B	B	100	S	S	100	B	B	100	095	090	090
Median	100	100	100	100	102	100	100	110	115	110	100	100	100	100	100
Count	11	9	5	4	8	14	13	15	20	17	16	13	14	14	11
UQ	100	100	107	105	115	110	112	120	120	120	110	107	110	100	100
LQ	090	095	090	100	100	100	095	110	100	100	100	100	100	090	090
QR	10	5	17	5	15	10	17	10	20	20	10	7	10	10	10

* Tabulation of 100 = 100 km.

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute

March 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
120	120	130	120	115	100	100	100	100	100	S	S	S	S	S	130
140	120	S	B	B	B	B	B	B	120	S	S	S	S	S	100
S	S	G	G	B	B	G	B	S	S	S	S	S	S	S	S
S	S	B	B	B	B	B	B	B	S	S	S	S	S	S	100
100	B	120	G	110	110	S	S	S	S	S	S	S	S	S	100
105	120	100	120	100	110	100	100	S	S	110	115	S	120	110	100
100	100	100	100	B	B	B	B	S	S	S	S	S	S	S	100
130	130	115	100	100	105	100	100	100	S	S	S	S	S	090	090
120	S	S	100	110	100	100	100	100	090	080	S	S	090	S	S
120	S	B	B	B	B	B	B	B	110	090	B	S	S	095	S
S	S	S	S	B	B	B	110	B	110	100	S	105	100	105	090
140	B	G	G	B	B	B	B	B	B	S	S	S	S	S	S
S	B	S	B	B	B	B	150	125	120	S	S	S	S	100	S
S	B	100	100	100	090	B	B	B	S	S	S	S	S	100	S
S	B	S	S	S	S	S	S	S	S	S	S	S	S	S	S
120	140	B	B	B	B	S	B	S	S	S	S	S	S	100	100
120	C	100	S	B	G	B	B	B	S	S	S	B	S	B	B
105	100	100	100	S	090	B	090	B	S	S	S	S	S	S	100
S	110	110	C	110	100	100	100	090	S	100	C	B	S	B	B
B	100	C	100	100	090	090	090	080	100	S	S	100	090	S	S
120	100	100	B	S	B	B	B	180	130	120	S	S	110	100	100
110	110	110	100	110	100	100	100	100	100	S	160	100	100	S	100
110	110	105	105	105	B	B	G	100	100	100	100	100	100	090	S
120	120	B	B	B	S	B	•S	S	S	S	100	100	100	100	B
100	102	100	110	B	B	G	120	110	100	100	100	100	S	S	B
B	B	B	B	B	B	B	160	100	S	100	100	B	100	100	S
B	B	100	B	B	B	S	S	S	S	S	S	S	S	105	100
100	100	100	100	100	100	100	S	S	S	S	S	S	S	B	B
100	100	B	B	100	090	090	B	B	S	S	S	S	S	S	100
B	100	100	B	100	090	090	090	G	S	S	S	S	S	S	B
100	B	B	100	095	090	090	S	B	S	S	S	S	100	S	S
115	110	100	100	100	100	100	100	100	100	100	100	100	100	100	100
120	17	16	13	14	14	11	13	11	11	9	6	6	10	12	14
120	120	110	107	110	100	100	115	110	120	105	115	100	100	102	100
100	100	100	100	100	090	090	095	100	100	095	100	100	100	098	100
120	20	10	7	10	10	10	20	10	20	10	15	-	-	4	-

Characteristic: Type of Es

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0

March 1964

Observed at:
Bangkok, Thailand
Lat. 13.73°N, Long. 100.57°E
105°E Mean Time (GMT + 7 hours)

Hour / Date	00	01	02	03	04	05	06	07	08	09	10	11	12
1	f	f	-	-	f	f5	f	f	c	c	cℓ	c	c
2	f3	f	f	f	-	f	-	-	h	h	-	-	-
3	f2	f	-	-	-	f	f	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	c	-
5	f	f	-	-	-	f	f	f	ℓ	h	c	c	c
6	f2	f	-	f2	f4	f2	-	f	ℓ	ℓ	ℓ	hℓ	ℓ
7	-	-	-	-	f	f	-	f	ℓ	ℓ	ℓ	ℓ	-
8	-	-	-	-	f2	f2	f2	f	h	h	c	c	c
9	f	-	-	-	-	-	-	c	c	-	-	ℓh	c
10	-	f	f	-	-	f	f	-	h	-	-	-	-
11	f	f	-	f	-	-	-	-	-	-	-	-	-
12	f	-	-	-	f	f2	f	-	h	-	-	-	-
13	f	-	-	-	f	-	-	-	-	-	-	-	-
14	-	-	-	-	-	-	-	-	-	ℓ	ℓ	ℓ	ℓ
15	-	-	-	-	f	-	-	-	-	-	-	-	-
16	-	-	-	-	-	-	-	-	h	h	-	-	-
17	-	-	-	-	-	-	-	s	h	-	c	-	-
18	-	-	-	-	-	f	f	f	c	c	ℓ	c	-
19	f2	f	f	-	-	-	-	-	-	cℓ	c	-	cℓ
20	-	-	-	-	-	-	-	ℓ	-	ℓ	-	ℓ	ℓ
21	-	-	f	-	-	-	f	c	cℓ	ℓ	ℓ	-	-
22	f	f	-	-	-	-	-	c	c	c	c	c	c
23	f	-	f	f2	-	f	ℓc	cℓ	c	cℓ	c	c	c
24	-	-	-	-	-	f	f	cℓ	c	c	-	-	-
25	-	-	-	-	f	f	c	c	c2	c2	c3	c	c
26	-	-	-	-	-	f2	f	-	-	-	-	-	-
27	-	-	-	-	-	-	-	f	-	ℓ	ℓ	-	-
28	-	-	f3	f3	f2	f2	f	f2	ℓ	ℓ	ℓ	ℓ	ℓ
29	-	-	-	-	-	-	f2	f	ℓ	ℓ	-	-	ℓ
30	f2	f	-	-	-	-	-	-	-	ℓ	ℓ	-	ℓ
31	-	-	-	-	f	f	-	-	ℓ	-	-	ℓ	ℓ
Median	-	-	-	-	-	-	-	-	-	-	-	-	-
Count	-	-	-	-	-	-	-	-	-	-	-	-	-
UQ	-	-	-	-	-	-	-	-	-	-	-	-	-
LQ	-	-	-	-	-	-	-	-	-	-	-	-	-
QR	-	-	-	-	-	-	-	-	-	-	-	-	-

A

IONOSPHERIC DATA
Sweep: 1 Mc to 25 Mc in 0.5 minute
March 1964

08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
c	c	cℓ	c	c	c	c2	c	ℓ2	ℓ	–	–	–	–	f	f
h	h	–	–	–	–	–	–	–	c	–	–	–	–	–	f
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	c	–	–	–	–	–	–	–	–	–	–	–	–
ℓ	h	c	c	c	c	–	–	–	–	–	–	–	–	–	f2
ℓ	ℓ	ℓ	hℓ	ℓ	c	c	c	–	–	f	f	–	f	f	f
ℓ	ℓ	ℓ	ℓ	–	–	–	–	–	–	–	–	–	–	–	f3
h	h	c	c	c	c	c	c	ℓ	–	–	–	–	–	f2	f
c	–	–	ℓh	c	c2	c2	ℓ	ℓ	ℓ	f2	–	–	f	–	–
h	–	–	–	–	–	–	–	–	f	f3	–	–	–	f	–
–	–	–	–	–	–	c	c	c	ℓ	f	f	f	f	f	f
h	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	h	c	c	–	–	–	–	f	–
–	ℓ	ℓ	ℓ	ℓ	ℓ	–	–	–	–	–	–	–	–	f	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
h	h	–	–	–	–	–	–	–	–	–	–	–	–	fs	–
h	–	c	–	–	–	–	–	–	–	–	–	–	–	–	–
c	c	ℓ	c	–	ℓ	–	ℓ	–	–	–	–	–	–	–	f2
–	cℓ	c	–	cℓ	cℓ	cℓ	c	ℓ	–	f	–	–	–	–	–
–	ℓ	–	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	c	–	–	f3	f	f	–
cℓ	ℓ	ℓ	–	–	ℓ	–	–	hℓ	h	c	–	–	f	f9	f2
c	c	c	c	c	c	c2	c	ℓ	f	–	f	f4	f	–	f
c	cℓ	c	c	c	–	–	–	ℓ	ℓ3	f3	f3	f4	f	f	–
c	c	–	–	–	–	–	–	–	–	–	f3	f3	f2	f2	–
c2	c2	c3	c	c	–	–	c	c	c	f2	f3	f	–	–	–
–	–	–	–	–	–	–	h	c	–	f2	f	–	f	f	f
–	ℓ	ℓ	–	–	–	–	–	–	–	–	–	–	–	f3	f3
ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	ℓ	–	–	–	–	–	–	–	–	–
ℓ	ℓ	–	–	ℓ	ℓ	ℓ	–	–	–	–	–	–	–	–	f2
–	ℓ	ℓ	–	ℓ	ℓ	ℓ	ℓ	–	–	f	–	–	–	–	–
ℓ	–	–	ℓ	ℓ	ℓ	ℓ	–	–	–	–	–	–	f	f	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

B

MEDIAN VALUES MARCH 1964

Hour Local	fmin (Mc)	foF2 (Mc)	M(3000)F2	h'F2 (km)	h'F (km)	foF1 (Mc)	M(3000)F1	foE * (Mc)	h'E (km)	fbEs (Mc)	foEs (Mc)	h'Es (km)
00	1.7	5.8	270	-	230	-	-	-	-	2.0	3.5	100
01	1.5	5.4	275	-	220	-	-	-	-	2.2	2.4	100
02	1.5	5.0	280	-	200	-	-	-	-	2.1	3.7	100
03	1.4	3.3	300	-	200	-	-	-	-	-	4.2	100
04	1.7	2.5	310	-	220	-	-	-	-	1.8	2.7	102
05	1.7	2.4	310	-	230	-	-	-	-	1.7	2.6	100
06	1.7	2.8	310	-	250	-	-	-	-	2.2	2.8	100
07	2.4	5.5	320	-	220	-	-	-	100	2.5	3.5	110
08	2.7	6.7	320	315	200	4.1	390	-	100	3.1	3.3	115
09	3.0	7.1	330	310	200	4.3	390	-	100	3.5	3.7	110
10	3.4	7.0	330	330	200	4.4	400	-	100	3.9	3.9	100
11	3.7	6.8	340	330	180	4.5	410	-	100	3.9	4.0	100
12	3.6	6.8	342	320	200	4.5	410	-	100	4.0	4.0	100
13	3.5	7.4	350	330	180	4.5	405	-	100	4.1	4.0	100
14	3.5	7.8	378	310	195	4.5	400	-	100	4.5	4.5	100
15	3.3	8.8	380	280	190	4.3	392	-	100	3.8	3.6	100
16	3.1	9.0	375	280	200	4.3	390	-	110	3.4	3.8	100
17	3.6	8.8	375	250	225	-	-	-	110	2.7	3.5	100
18	2.4	8.8	340	-	230	-	-	-	-	2.9	3.7	100
19	2.3	9.0	350	-	240	-	-	-	-	3.4	3.9	100
20	2.4	8.5	320	-	230	-	-	-	-	2.9	3.9	100
21	2.2	7.8	280	-	230	-	-	-	-	2.7	3.4	100
22	2.2	7.0	265	-	230	-	-	-	-	3.1	4.0	100
23	1.7	6.4	280	-	230	-	-	-	-	2.3	3.5	100

* Insufficient data for reliable median.

IONOSPHERIC DATA
MONTHLY MEDIAN CHARACTERISTICS
BANGKOK, THAILAND
MARCH 1964

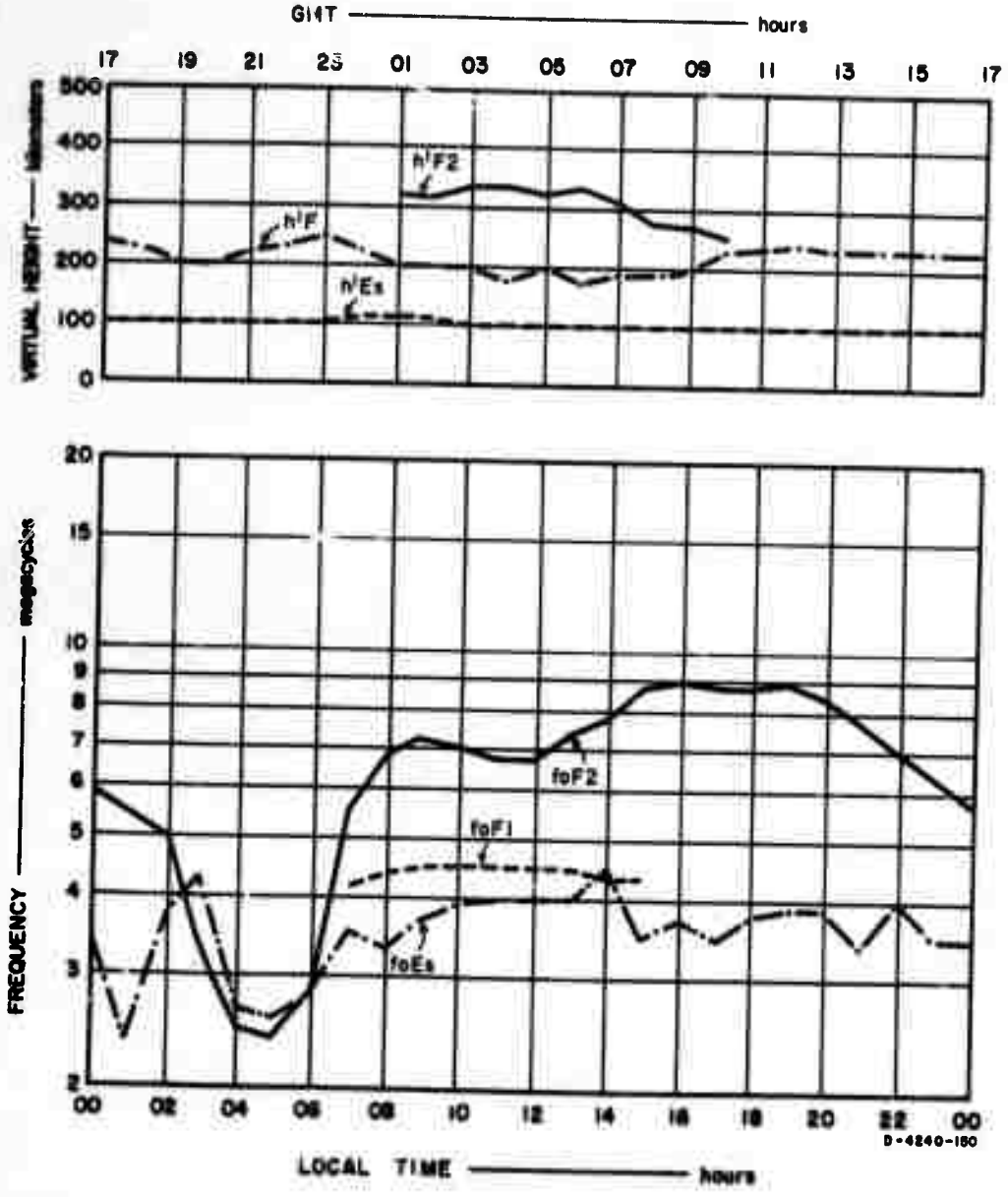

FIG. 1 SUMMARY GRAPHS

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